ADVANCED ENDPOINT PROTECTION TEST REPORT

Sophos Intercept X Advanced 2.0.10

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Overview

NSS Labs performed an independent test of the Sophos Intercept X Advanced 2.0.10. The product was subjected to thorough testing at the NSS facility in Austin, Texas, based on the Advanced Endpoint Protection (AEP) Test Methodology v3.0, which is available at www.nsslabs.com. This test was conducted free of charge and NSS did not receive any compensation in return for Sophos's inclusion.

This report provides detailed information about this product and its security effectiveness. Additional comparative information is available at www.nsslabs.com.

As part of the initial AEP group test setup, 96 instances of the endpoint product were deployed on Windows 7 and Windows 10 operating systems. All product configurations were reviewed, validated, and approved by NSS prior to the test. Figure 1 presents the overall results of the test.

Product						3-Year Cost – 2,500 Agents (US$)		
Sophos Intercept X Advanced 2.0.10						$101,967		
	HTTP	Email	Docs & Scripts	Offline Threats	Unknown Threats	Exploits	Blended Threats	Evasions
Block Rate	100%	99.5%	96.8%	100%	100%	100%	88.5%	100%
Additional Detection Rate	0.0%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Figure 1 – Overall Test Results

Block Rate is defined as the percentage of exploits and malware blocked within 15 minutes of attempted execution. The *Additional Detection Rate* is defined as the percentage of exploits and malware detected but not blocked within 15 minutes of attempted execution.

An AEP product with a low block rate will incur less security savings, since additional operational overhead will be required to remediate the effects of a compromised system and protect the business. For detailed total cost of ownership (TCO) analysis, please see the TCO Comparative Report at www.nsslabs.com.

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Security Effectiveness

The aim of this section is to verify that the AEP product is capable of detecting, preventing, and continuously logging threats accurately, while remaining resistant to false positives. This section utilizes real threats and attack methods that are being used by cybercriminals and other threat actors, based on attacks collected from NSS' global threat intelligence network.

The ultimate goal of any attack on a computer system is to gain access to a target host and perform an unauthorized action that results in the compromise or destruction of an asset or data. Computer systems are designed with many levels of protection to prevent unauthorized access. However, intruders may use several techniques to circumvent these protections, such as targeting vulnerable services, invoking privilege escalation, or replacing key operating system files. AEP products protect against automated and manual threats by leveraging the following key capabilities:

- Inbound threat detection and prevention (prior to execution)
- Execution-based threat detection and prevention (during execution)
- Continuous monitoring post-infection and ability to act in the event of compromise (post-execution)

NSS has created a unique testing infrastructure—the NSS Labs Live Testing™ harness, which incorporates multiple product combinations, or "stacks," within the attack chain. Each stack consists of either an operating system alone or an operating system with additional applications installed (e.g., a browser, Java, and Adobe Acrobat). This test harness continuously captures suspicious URLs, exploits, and malicious files from threat data generated from NSS and its customers, as well as data from open-source and commercial threat feeds. Captured malicious samples are further validated to confirm that they are malicious in nature. During testing, NSS combines its knowledge of a product's defensive capabilities with these samples.

An AEP product must be able to detect, prevent, continuously monitor, and take action against threats while providing end-to-end visibility through event logs generated by the endpoint product. Each type of threat (e.g., malware, exploits, blended threats, and evasions) contains unique infection vectors. This test aims to determine how effectively the AEP product can protect against a threat, regardless of infection vector or method of obfuscation. Within this report, the term "threat" is used to refer to malware, exploits, or blended threats that are able to successfully access, download, and execute on a target system, with or without subsequent post-infection compromise and/or outbound communication attempts.

One of the most common threats to the enterprise is the infection of enterprise systems by malicious software. Products were tested against threats from the following categories:

- Malware
- Blended threats
- Offline threats
- Unknown threats
- Documents and scripts
- Evasions
- Exploits
- Any combination of the above in addition to follow-on threat actions or behaviors

Each type of threat is generally deployed via one of the following common infection vectors:

- **HTTP**: These are web-based attacks where the user is deceived into clicking on a malicious link (on, for example, a web page or a banner advertisement) to download and execute malware, or where the user merely needs to visit a web page hosting malicious code in order to be infected via exploits (also known as a drive-by exploit).
- **Email (IMAP4/POP3)**: These are inbound, email-based attacks where the user is deceived into clicking on a malicious link within an email to download and execute malware, or where the user is asked to visit a web page that hosts malicious code in order to be infected via exploit.

False Positive Rate

The ability of the AEP product to correctly identify and allow benign content is as important as its ability to provide protection against malicious content. NSS ran various samples of legitimate application files and documents, all of which the product was required to properly identify and allow. If any legitimate files could not be opened or executed immediately, this was recorded as a false positive. Figure 2 depicts the false positive rate for the Intercept X Advanced.

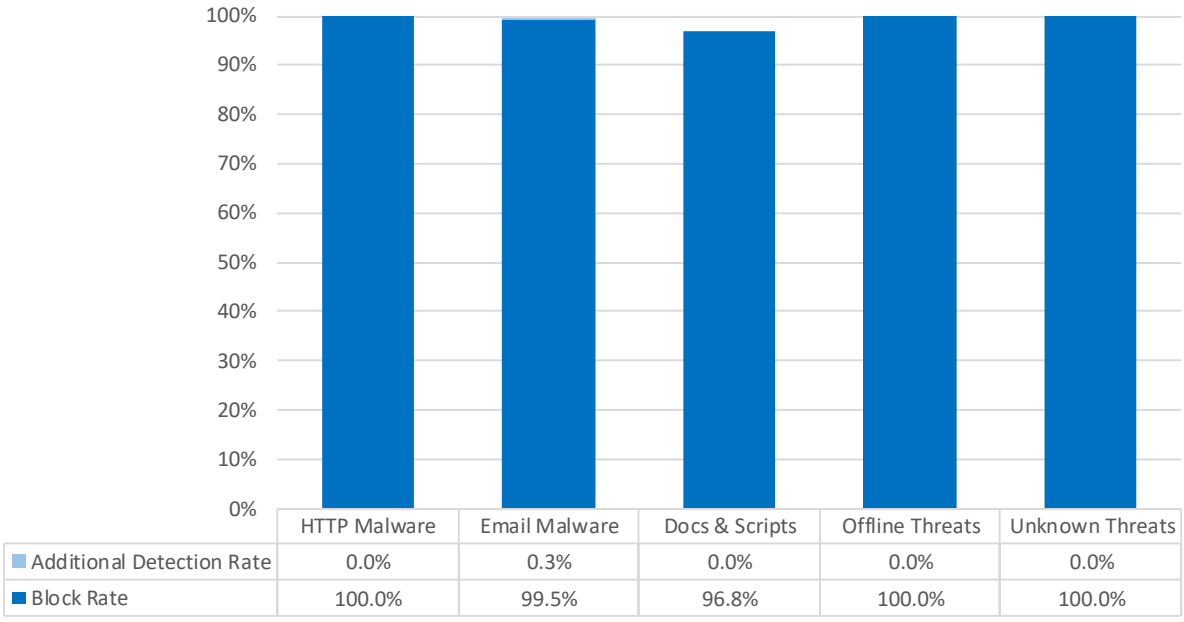
Product	False Positive Rate
Sophos Intercept X Advanced 2.0.10	0.1%

Figure 2 – False Positive Rate

Malware

One of the most common ways in which systems are compromised is through the use of malware. Malware can infect an endpoint using numerous attack vectors or delivery methods.

Figure 3 depicts test results for malware delivered via HTTP, email, documents and scripts, offline mechanism, and previously unknown threats.



	HTTP Malware	Email Malware	Docs & Scripts	Offline Threats	Unknown Threats
Additional Detection Rate	0.0%	0.3%	0.0%	0.0%	0.0%
Block Rate	100.0%	99.5%	96.8%	100.0%	100.0%

Figure 3 – Malware (Various Delivery Methods)

During testing for malware delivered via HTTP and malware delivered using email, NSS intentionally tested a large number of the same samples in order to validate whether or not the introduction mechanism had any significant impact on detection or block results. Test results demonstrate that there was no significant difference in detection and block rates regardless of introduction mechanism.

Exploits

Figure 4 depicts the results of exploit testing for the Intercept X Advanced. Exploits are defined as malicious software designed to take advantage of existing deficiencies, such as vulnerabilities or bugs, in hardware or software systems.

Figure 4 does not include results for 138 drive-by exploit test cases. Following testing, it could not be determined that these drive-by exploits executed consistently across all products in the test. However, additional analysis was performed to assess a product's ability to detect or block drive-by exploits.

It was observed that the Intercept X Advanced can block HTTP drive-by exploit attacks. Specifically, testing revealed that the product can prevent the attacks using URL reputation. The product's Endpoint Protection module prevented victim machines from visiting blacklisted websites by displaying a splash page in the browser. In the event that a domain was identified as malicious, the splash page contained signature information about the conviction. Other technologies may exist to block exploits, but they were not observed. The product's management console identified the malicious domain that was navigated to in the block alert.

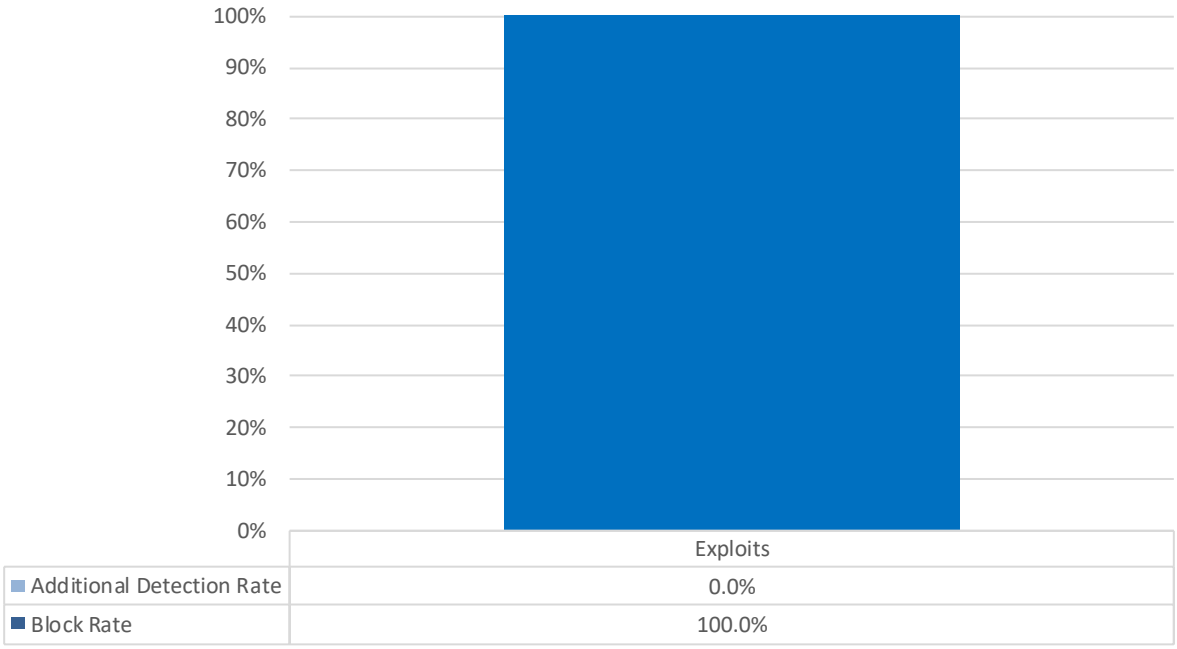


Figure 4 – Exploits

Blended Threats

Figure 5 depicts the results of blended threats testing for the Intercept X Advanced. Blended threats possess the characteristics of socially engineered malware as well as the features of legitimate applications. In these tests, all blended threats were delivered via deceptive emails. Blended threats attempt to make it difficult to distinguish between malicious and legitimate activity. Enterprises expect AEP products to be able to address this type of threat. During this testing, a series of attack techniques was used to execute code using legitimate functionality in Microsoft Office products. The same series of attack techniques was also used for 20% of the malware samples delivered via documents and scripts. Ten unique techniques were used across three different Microsoft Office applications. If the attacks were successful, the test cases deployed custom ransomware payloads.

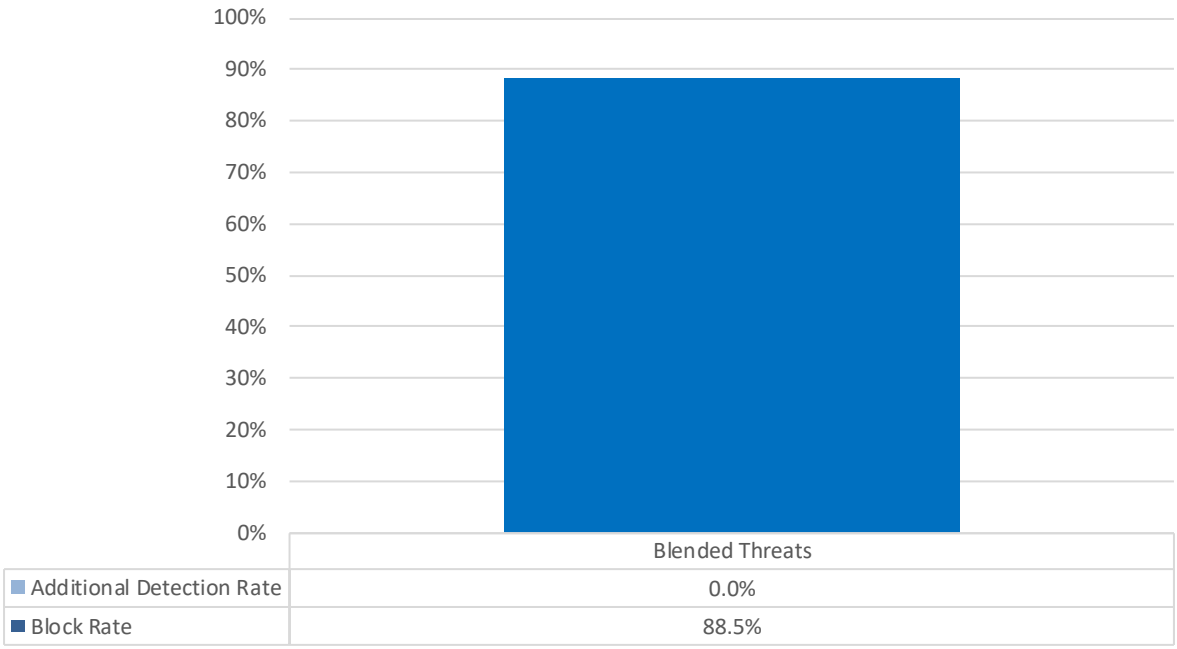


Figure 5 – Blended Threats

Resistance to Evasion Techniques

Figure 6 depicts the results of evasions testing for the Intercept X Advanced. Cybercriminals deploy evasion techniques to disguise and modify attacks at the point of delivery in order to avoid detection by AEP products. If an AEP product fails to correctly identify a specific type of evasion, an attacker can potentially deliver malware that the product would normally detect. Attackers can modify attacks and malicious code in order to evade detection in a number of ways.

This test aims to verify that the AEP product is capable of detecting, preventing, and continuously monitoring threats and that it is able to take action against malware, exploits, and blended threats when subjected to common evasion techniques. Please contact NSS for information on the evasions utilized.

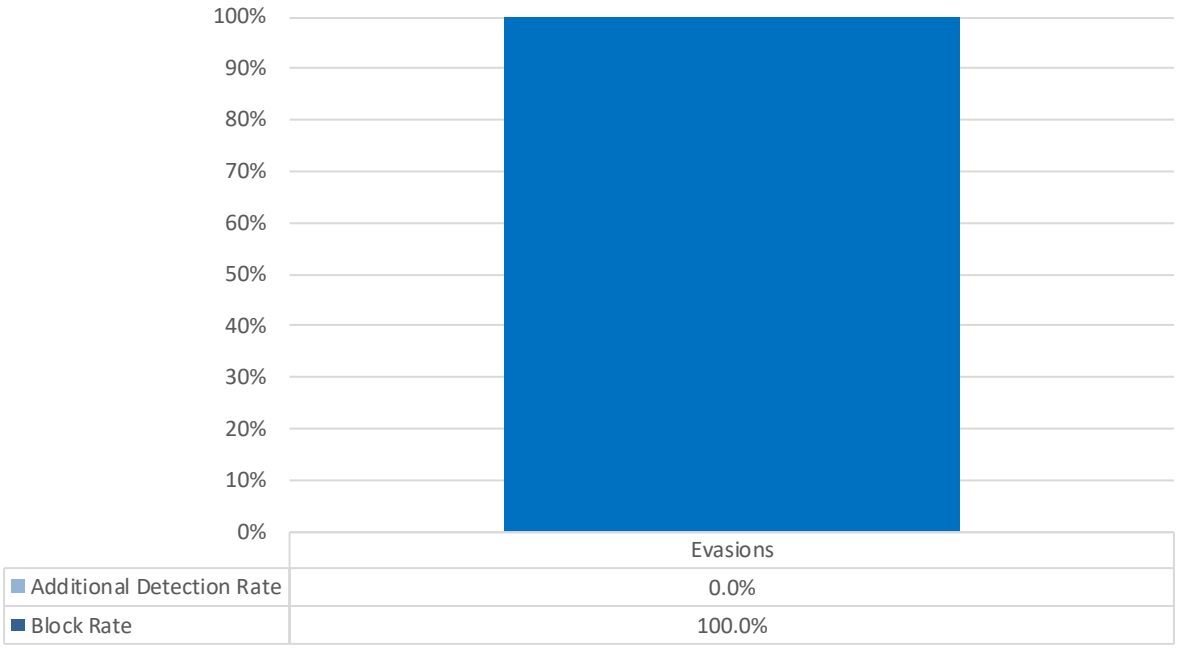


Figure 6 – Resistance to Evasions

Resistance to Tampering Techniques

This test measured whether a product was vulnerable to tampering techniques that target the product itself. The following techniques were leveraged during testing:

- Disabled the product through the GUI or command line
- Disabled protections by using a combination of Windows Service Functions or process termination
- Uninstalled the product using traditional Windows-installed software removal methods and the product's own installer/uninstaller files
- Used DLL hijacking to execute code and disable protections with an arbitrary DLL

All of these tampering techniques leverage administrator privileges. In enterprises where users are not granted administrator privileges, privilege escalation exploits (such as those utilized during this testing) would allow similar outcomes.

When tampering techniques were utilized, at least one potential issue or security vulnerability was discovered in each product tested.

Additional Test Engineer Observations

The Intercept X Advanced displays information about threats that have occurred, information on the product and engine version the endpoint is running, and event history. The cloud-based management console was tested. The *Alerts* section of the console provides information about individual threats and displays the *Attack Story Line* that occurs when an endpoint is compromised. The console also enables User Account Control (UAC) on all endpoints by default. The console does not provide a graphical representation of the attack chain that occurs on compromised endpoints.

Threat Event Reporting Criteria

During TCO evaluations, it is important to understand an AEP product's reporting capabilities as these can vary among products. Figure 7 presents data that is used in the Security Value Map™ (SVM) calculations for the Intercept X Advanced. Please refer to the TCO and SVM Comparative Reports for more detail.

Threat Event Reporting Capabilities	Score
Management Console	
Lists hostname or IP address of compromised endpoint?	Yes
Lists URL of source of threat?	Yes
Lists hash of file binaries?	Yes
Lists file path of threats?	Yes
Lists outbound IPs?	Yes
Conveys difference between detection and block?	Yes
Provides detail about reason for conviction?	Yes
Syslog Messages	
Lists hostname or IP address of compromised endpoint?	NA[1, 2, 3]
Lists URL of source of threat?	NA
Lists hash of file binaries?	NA[4]
Lists file path of threats?	NA[1, 2, 4]
Lists outbound IPs?	NA[4]
Conveys difference between detection and block?	NA
Provides detail about reason for conviction?	NA[1, 3]
Syslog Alternative (API, Splunk Connector, etc.)	Yes
Additional Forensics Capabilities	Yes
Describes registry changes in the management console?	Yes[4]
Provides view of shell commands in the management console?	Yes[4]
Provides threat attack chains/trees in the management console?	Yes[4, 5]

Figure 7 – Threat Event Reporting Capabilities

1 Sophos makes these items available in the endpoint agent.

2 Sophos makes these items available in the Windows Event Viewer.

3 Sophos makes these items available in the API.

4 Sophos makes these items available in the Forensics DB (stored locally on endpoints).

5 Sophos makes these items available in the management console.

Three-Year Product Acquisition Cost

Implementation of AEP products can be complex, with several factors affecting the overall cost of deployment, maintenance, and upkeep. All of these factors should be considered over the course of the useful life of a product, as well as any of its components and any application or service that is leveraged during testing.

- **Product purchase –** The cost of acquisition
- **Product maintenance –** The fees paid to the vendor (including software, maintenance, and updates)
- **Installation –** The time required to configure the product, deploy it in the network, apply updates and patches, and set up desired logging and reporting

For the purposes of this report, capital expenditure (capex) items (the cost of acquisition and installation) are included for only 2,500 agents.

Cost Information

Calculations are based on vendor-provided pricing information. Where possible, the 24/7 maintenance and support option with 24-hour replacement is used, since this is the option typically selected by enterprise customers. Prices depicted include the purchase and maintenance costs for 2,500 software agents only; costs for central management solutions (CMS) may be extra. Please contact NSS for additional detail. Year 1 Cost includes an additional $600 installation cost that was applied to all products in the test.

Product	Year 1 Cost	Year 2 Cost	Year 3 Cost	3-Year TCO
Sophos Intercept X Advanced 2.0.10	$34,389	$33,789	$33,789	$101,967

Figure 8 – Three-Year Cost (US$)

For additional TCO analysis, including operational costs, refer to the AEP TCO Comparative Report, which is available at nsslabs.com.

Appendix A: Product Scorecard

Tests	Samples[1]	Test Results (%)[2]	
False Positives (detection accuracy)	1,053	0.1%	
Malware (various delivery mechanisms)	Percentage of Total Samples	Block Rate	Additional Detection Rate
HTTP	29.1%	100.0%	0.0%
Email	50.5%	99.5%	0.3%
Documents and Scripts	6.9%	96.8%	0.0%
Offline Threats	1.7%	100.0%	0.0%
Unknown Threats	2.5%	100.0%	0.0%
Exploits	1.9%	100.0%	0.0%
Blended Threats	2.9%	88.5%	0.0%
Evasions	4.6%	100.0%	0.0%

Figure 9 – Scorecard

Test Composition

Each product was initially tested against 1,629 unique malicious samples and 1,061 unique false positive samples. Ultimately, 897 unique malicious samples and 1,053 unique false positive samples met NSS' validation criteria and were included as part of the test.

Contributors (Samples and Techniques)

Jorge Damian, Eric Llana, Faiz Merchant, Edsel Valle, Kevin Valle

[1] No product is able to provide 100% protection against attacks. A single successful attack is often all an attacker needs to gain unauthorized access, infiltrate an organization, and steal or destroy data.

[2] *Block Rate* is defined as the percentage of exploits and malware blocked within 15 minutes of attempted execution. The *Additional Detection Rate* is defined as the percentage of exploits and malware detected but not blocked within 15 minutes of attempted execution.

Test Methodology

NSS Labs Advanced Endpoint Protection (AEP) Test Methodology v3.0

NSS Labs Evasions Test Methodology v1.2

Copies of the test methodologies are available at www.nsslabs.com.

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